

Claims

*What is claimed is:*

1. A method for etching a feature in an integrated circuit wafer, the wafer  
5 incorporating at least one low-k dielectric layer, the method comprising:  
disposing the wafer within a reaction chamber;  
introducing a flow of fluorocarbon-containing etchant gas into the reaction  
chamber;  
forming a plasma from the etchant gas within the reaction chamber; and  
10 etching the feature in at least a portion of the low-k dielectric layer.
2. The method, as recited in claim 1, wherein the low-k dielectric layer is an  
organic low-k dielectric layer.
- 15 3. The method, as recited in claim 2, wherein the fluorocarbon is selected from a  
group consisting of CH<sub>3</sub>F, CH<sub>2</sub>F<sub>2</sub>, and CHF<sub>3</sub>.
4. The method, as recited in claim 3, wherein the fluorocarbon-containing etchant  
gas further contains additives selected from the group consisting of oxygen, hydrogen,  
20 nitrogen, and ammonia.
5. The method, as recited in claim 4, wherein the organic dielectric layer is made  
of SiLK.
- 25 6. The method, as recited in claim 5, wherein the fluorocarbon has a flow rate,  
wherein the flow rate of the fluorocarbon is between 0.5 sccm and 50 sccm.
7. The method, as recited in claim 2, wherein the organic dielectric layer is made  
of SiLK.
- 30 8. The method, as recited in claim 7, wherein the fluorocarbon-containing etchant  
gas comprises CH<sub>3</sub>F gas, H<sub>2</sub> gas, and N<sub>2</sub> gas.
9. The method, as recited in claim 7, wherein the fluorocarbon-containing etchant  
35 gas comprises CH<sub>3</sub>F gas and NH<sub>3</sub> gas.
10. The method, as recited in claim 7, wherein the fluorocarbon-containing  
etchant gas comprises CH<sub>3</sub>F gas, O<sub>2</sub> gas, and N<sub>2</sub> gas.

11. The method, as recited in claim 5, wherein the fluorocarbon has a flow rate, wherein the flow rate of the fluorocarbon is between 0.5 sccm and 50 sccm.

5 12. The method, as recited in claim 2, wherein the fluorocarbon-containing etchant gas comprises  $\text{CH}_3\text{F}$  gas,  $\text{H}_2$  gas, and  $\text{N}_2$  gas.

13. The method, as recited in claim 2, wherein the fluorocarbon-containing etchant gas comprises  $\text{CH}_3\text{F}$  gas and  $\text{NH}_3$  gas.

10 14. The method, as recited in claim 2, wherein the fluorocarbon-containing etchant gas comprises  $\text{CH}_3\text{F}$  gas,  $\text{O}_2$  gas, and  $\text{N}_2$  gas.

15 15. An integrated circuit on a wafer, wherein the integrated circuit has a feature formed in at least one low-k dielectric layer, wherein the feature is etched by the method, comprising:

disposing the wafer within a reaction chamber;  
striking a plasma within the reaction chamber;  
introducing a flow of fluorocarbon-containing etchant gas into the reaction  
20 chamber; and  
with the plasma and the etchant gas in operative combination, etching the feature in at least a portion of the low-k dielectric layer.

25 16. The integrated circuit, as recited in claim 15, wherein the low-k dielectric layer is an organic low-k dielectric layer.

17. The integrated circuit, as recited in claim 16, wherein the fluorocarbon is selected from a group consisting of  $\text{CH}_3\text{F}$ ,  $\text{CH}_2\text{F}_2$ , and  $\text{CHF}_3$ .

30 18. The integrated circuit, as recited in claim 17, wherein the fluorocarbon-containing etchant gas further contains additives selected from the group consisting of oxygen, hydrogen, nitrogen, and ammonia.